

1 An apparatus for assisting entry into high road clearance vehicles
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10 U.S. Patent Application of:

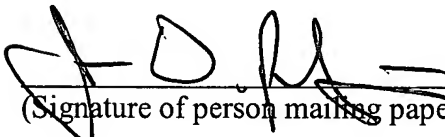
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1 TITLE OF THE INVENTION

2 An apparatus for assisting entry into high road clearance vehicles
3

4 CROSS REFERENCE TO RELATED APPLICATIONS

5 This is a continuation of application serial number 10/041,273 filed November 7, 2001.
6

7 STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

8 Not applicable
9

10 BACKGROUND OF THE INVENTION

11 This invention relates generally to the field of vehicle accessories, and more particularly
12 to automotive side bars for assisting entry into high road clearance vehicles.
13

14 The present invention relates in general to vehicle side bars for sport utility vehicles,
15 pick-up trucks, jeeps and similar vehicles.
16

17 A vehicle side bar is an accessory which has gained considerable popularity in recent
18 years. In essence, it is a wide tubular bar which is attached to the side of a vehicle just below the
19 passenger cab. It usually covers the length of the cab and projects laterally to the outside of the
20 cab side or door surface. It is usually bolted or welded to the main longitudinal frame beam of
21 the vehicle chassis.
22

23 The side bar is both an appearance accessory and provides some protection for door and
24 side of the vehicle cab to deflect debris.
25

1 Many vehicles of earlier date had running boards along the side of the vehicle to provide
2 a stable platform to stand on and assist in entry and exit from the vehicle. More recently, side
3 bars have been manufactured and sold, primarily by small and large automotive accessory
4 companies. Side bars, while primarily a styling accessory, have been modified to provide a step
5 built into the side bar to assist in entry of and exit from the vehicle. The side bar system of the
6 present invention, in contrast with side bars with a step built into the bar, provides a step
7 assembly independent of the side bar providing a stable step closer to the ground.

8
9 Running boards were at one time a standard feature on most passenger vehicles,
10 including light duty trucks such as pickup trucks. The running board provided an intermediate
11 step that was an aid in entering the passenger compartment of the vehicle.

12
13 As vehicle designs changed, the bodies of the vehicles were lowered and the running
14 board disappeared from the design of the vehicle. The body of the vehicles, in addition to being
15 lowered was widened to provide more space in the passenger compartment. This design concept
16 of eliminating running boards carried over to other vehicles that were not lowered in design, such
17 as four wheel drive pickups and sport utility vehicles.

18
19 Four wheel drive vehicles are intentionally designed with a relatively high road
20 clearance, that is the frame and body is supported at a relatively high distance from the ground.
21 This is a desired characteristic, since the user of the vehicles wants the maximum clearance for
22 traversing adverse road conditions such as deep snow, muddy and rutted roads and the like.
23 Additionally four wheel drive vehicles are often driven off improved roadways where all types of
24 conditions are likely to be encountered.
25

1 One of the problems with a high clearance vehicle is the height of the entry into the
2 passenger compartment. The floor of the passenger cab is of necessity high above the ground and
3 for many individuals, the required "step" is too high to permit easy entry.
4

5 Side bars such as those similar to and described in United States Patent 4,935,638 provide
6 a step on the side bar itself. This step is many times still too high off the ground to permit easy
7 entry into the vehicle. Aesthetically, a step built into the side bar also visually disrupts the clean
8 line and streamlined appearance of the bar.

9 BRIEF SUMMARY OF THE INVENTION 10

11 The primary object of the invention is assists entry into vehicle passenger compartment.
12 Another object of the invention is to provide an intermediate step between the ground and the
13 floor of the passenger compartment.

14 Another object of the invention is to provide a stylish appearance accessory to vehicle.

15 A further object of the invention is to provide a functional side step and/or a protective
16 device for the door and side of the vehicle cab.

17 Other objects and advantages of the present invention will become apparent from the
18 following descriptions, taken in connection with the accompanying drawings, wherein, by way
19 of illustration and example, an embodiment of the present invention is disclosed.

20 In accordance with a preferred embodiment of the invention, there is disclosed an
21 apparatus for assisting entry into high road clearance vehicles having a generally cylindrical side
22 bar adapted for attachment to a vehicle chassis, one or more smaller U-shaped cylindrical bars
23 attached to and suspended from said bar comprised of two end portions and a center bar, and a
24 generally flat surface on the top of each of said center bar of said U-shaped bars.

25 In accordance with another preferred embodiment of the invention, there is disclosed an
apparatus for assisting entry into high road clearance vehicles having a generally cylindrical side

1 bar adapted for attachment to a vehicle chassis, one or more U-shaped cylindrical bars attached
2 to and suspended from said bar comprised of two end portions and a center bar; and a non-skid
3 surface on the top of each of said center bars of said U-shaped bars.
4

5 The tubular side bar is mounted onto the vehicle chassis by means of mounting brackets
6 which attach to the chassis and the side bar by a variety of conventional means including but not
7 limited to welds, brazing or attachment with nuts and bolts.
8

9 The smaller U-shaped tubular bars are attached to the side bar by welds, brazing or other
10 means. Similarly, a step is constructed by attaching a flat bar to the top of the U-shaped tubing.
11 This configuration is the step assembly. An additional lower step can be constructed by using
12 another small U-shaped tubular bar and attaching it to the first step assembly. In this manner
13 additional steps can be produced for higher clearance vehicles.
14

15 The side bar and attached step assembly mounted by brackets to the vehicle chassis form
16 a streamlined accessory just below the bottom of the vehicle passenger cab and extending from
17 just aft of the forward wheel fender to just forward of the rear wheel fender. The step assembly
18 (or assemblies) is (are) suspended from the side bar and positioned just below each door or
19 passenger exit to assist entry and exit from the vehicle.
20

21 The composition of the tubular bars and flat bar can be metal or any of a number of high
22 strength composite materials. The finish of the bars can be but is not limited to chrome, polished
23 metal or high or low gloss paint to complement the appearance of the vehicle.
24

25 The drawings constitute a part of this specification and include exemplary embodiments
to the invention, which may be embodied in various forms. It is to be understood that in some

1 instances various aspects of the invention may be shown exaggerated or enlarged to facilitate an
2 understanding of the invention.

3 4 BRIEF DESCRIPTION OF THE SEVERAL DRAWINGS

5
6 Figures 1A and 1B are top and side plan views of the invention.

7 Figure 2 is a longitudinal cross sectional view of the invention taken along line A-A of
8 Figure 1.

9 Figures 3A through E are top and side plan views of the side bar, step assembly
10 components and mounting brackets.

11 Figure 4 is a side perspective view of the invention.
12

13 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

14 Detailed descriptions of the preferred embodiments are provided herein. It is to be
15 understood, however, that the present invention may be embodied in various forms. Various
16 aspects of the invention may be inverted, or changed in reference to specific part shape and
17 detail, part location, or part composition. Therefore, specific details disclosed herein are not to
18 be interpreted as limiting, but rather as a basis for the claims and as a representative basis for
19 teaching one skilled in the art to employ the present invention in virtually any appropriately
20 detailed system, structure or manner.

21 Turning now to the drawings, Figure 1A illustrates side bar 20 attached to the underside
22 of vehicle 22, partially shown in phantom. Vehicle 22 may be one of any number of sport utility
23 vehicles, pick up trucks or other vehicles. Side bar 20 is typically welded or brazed to mounting
24 brackets 26 which are then attached to vehicle underside chassis 24 of vehicle 22 by use of bolts,
25 welds, brazing or other means well known in the art. The side bar typically extends the majority

of the distance underneath a passenger compartment and may extend along the direction between the front and rear wheels of the vehicle. Side bar 20 may be formed from a generally cylindrical tube having a cross section of any a variety of polygonal shapes including, but not limited to, a circle, a square, a rectangle, a triangle, an oval, an ellipse, or any other suitable shape. Side bar 20 may also be any other rigid member that is capable of mounting on a chassis along the underside of the vehicle. Side bar 20 functions as a protective guard for the exterior side surfaces of vehicle 22 and serves as a stable platform for attachment of the smaller U-shaped bar of step assembly 28. Step assembly 28 may also be made using tubular construction. The invention teaches that a flat bar 29 may be attached on the upper surface of the center of the bar of step assembly 28 to thereby form a step. Alternatively a non-skid surface may be applied to that area of the bar to form a step surface on flat bar 29.

In a preferred embodiment of the invention the tubular bar of the step assembly 28 is attached to the side bar 20 by welding; the welds are ground and sanded to a smooth finish prior to polishing and/or painting of the metal surfaces of the invention. Typical side bars 20 and U-shaped tubular bars of the step assembly 28 comprise rugged tubular steel tubing although other materials including but not limited to high tensile strength composites may be used. Similarly, flat bars 29 that form a step are typically stamped steel although other materials may be used. In an alternative embodiment non-skid materials of various kinds can be applied to the top of the center of the tubular bar of the step assembly 28 to form a step.

On a four-door vehicle, side bar 20 is fitted with tubular bars for step assembly 28 and flat bar 29 positioned below and generally centered below each door. Step assembly 28 is preferably located relative to the doors so that a passenger can easily use the step to enter and exit vehicle 22. Alternatively, vehicle 22 may have two side doors, a third opening for a mini-club cab or a specialty vehicle with a plurality of doors for the passenger cab; in each case a step assembly and step is positioned below each door. In addition, a step assembly 28 may be located

1 behind the rear door just before the rear tire well to permit step access to the bed of the truck or
2 the rear roof surface of a sport utility vehicle.

3 Figure 1B shows a preferred embodiment of the invention from a side view before being
4 mounted on a vehicle. Step assembly 28 is a U-shaped bar having two ends 21 connected
5 together by a central bar 27 that together attach to side bar 20 to form a step. The angle at which
6 ends 21 attach to central bar 27 may be of any of a variety of angles typically from 0 to 45
7 degrees to facilitate easy access by a human foot and a stopping point on either side of central
8 bar 27 to inhibit slipping and undesired movement of the person using the step. Ends 21 may be
9 of two different angles on one step assembly depending on the application. Attached to or
10 formed in central bar 27 is flat surface (flat bar 29 of figure 1A) to form a convenient location for
11 a foot to alight.

12 Figure 2 illustrates a side cross sectional view of the invention along the line A-A of
13 Figure 1. In the preferred embodiment, side bar 30 is welded to mounting bracket 32. Mounting
14 bracket 32 is bolted to the vehicle underside chassis 34 to stably secure the side bar below the
15 vehicle body (not shown). Step assembly 36 (consisting of the tubular bar and step previously
16 described) is welded to side bar 30 at an appropriate angle to provide an optimum setback from
17 the vehicle passenger cab and easy to access surface to assist in entering and exiting the vehicle.
18 Preferably, the angle should be approximately 45 degrees from the horizontal plane. There may
19 be applications where the angle could be anywhere from 0 to 90 degrees relative to the horizontal
20 plane depending on vehicle height off the ground and the particular use intended.

21 Figures 3A through F show each of the component parts of a preferred embodiment in
22 more detail. Figure 3A shows a top plan view of side bar 40. During manufacture side bars 40
23 are cut to lengths customized for each vehicle. After cutting side bar 40 to the desired length, the
24 ends are bent and stylized bent ends 42 and 44 created. One or both of the bent ends may be
25 removed as depicted on the left bent end 44 in shaded outline in the figure to achieve the desired
stylized effect. In the preferred embodiment the tubular bar is comprised of mild steel of 3 inch

1 diameter and 14 gauge thickness although other generally cylindrical shapes and materials can be
2 used for side bar 40.

3
4 Figure 3B shows a side plan view of side bar 40 and accurately depicts a clean closed
5 appearance of the side bar with the bent ends removed as in outlined bent end 44 from Figure
6 3A.

7
8 Figure 3C shows a top plan view of step assembly tubular bar 50. During manufacture
9 step assembly tubular bars 50 are cut to lengths customized for each vehicle. The angle at which
10 the bend is applied to bar 50 may be of any of a variety, typically between approximately 0 to 45
11 degrees to permit easy access of a foot when stepping onto the step assembly. After cutting
12 tubular bar 50 to the desired length the ends are bent and stylized bent ends 52 and 54 created.
13 Bent ends 52 and 54 are then smoothed and recut to provide a surface that can be attached flush
14 to side bar 30. In the preferred embodiment tubular bar 50 is comprised of mild steel of 1.5 inch
15 diameter and 14 gauge thickness although other generally cylindrical shapes and materials can be
16 used for tubular bar 50.

17
18 Figure 3D shows side plan view of flat bar 58 that is used to create a stepping surface in
19 the step assembly. In the preferred embodiment the flat bar is welded to the top portion of the
20 tubular bar shown in Figure 3C in a manner that creates a step that is horizontal to the ground
21 when the vehicle is parked on a level surface. The flat bar typically consists of stamped steel
22 although other materials well known in the art may be substituted.

23 Figure 3E shows two side plan views of a preferred embodiment of the mounting bracket.
24 The mounting bracket typically consists of stamped steel and is fashioned to each vehicle model
25 to stably hold the side bar in the preferred position below the vehicle body. A typical mounting
bracket consists of arms 60 and 62 of varying lengths that hold the side bar in place. With a

1 preferred 3 inch diameter side bar the distance between the top and bottom arms 60 and 62
2 would be 2.25 inches allowing a secure attachment by means of welding or brazing of the side
3 bar to the arms 60 and 62. Extension 64 is attached to arms 60 and 62 and is adapted for
4 mounting on the chassis of the vehicle by bolts (not shown) placed in pre-drilled holes on
5 extension 64.
6

7 Figure 4 is side view of the preferred embodiment of the invention in a typical
8 installation mounted on high road clearance vehicle 78. As previously described, side bar 70 and
9 tubular bar of step assembly 72 form an aesthetically pleasing streamlined appearance along the
10 underside of the vehicle body. Bent arm 80 of the side bar complements the bent arms of the
11 step assembly tubular bars and forms a symmetrical visual that is pleasing to the eye and creates
12 a safe edge on the bar that is less likely to be caught on objects or people. Mounting brackets 76
13 are somewhat hidden in a properly installed installation and do not interfere with ingress or
14 egress from the vehicle. Likewise flat bar 74 for the step assembly forms a step without taking
15 away from the safe application as a step formed by the invention.
16

17 Without further analysis, the foregoing will so fully reveal the gist of the present
18 invention that others can, by applying current knowledge, readily adapt it for various
19 applications without omitting features that, from the standpoint of prior art, fairly constitute
20 essential characteristics of the generic or specific aspects of this invention; and therefore, such
21 adaptations should and are intended to be comprehended within the meaning and range of
22 equivalents of the following claims. Although this invention has been described in terms of
23 certain preferred embodiments, other embodiments that are apparent to those of ordinary skill in
24 the art are also within the scope of this invention, as defined in the claims which follow.
25

While the invention has been described in connection with a preferred embodiment, it is
not intended to limit the scope of the invention to the particular form set forth, but on the

1 contrary, it is intended to cover such alternatives, modifications, and equivalents as may be
2 included within the spirit and scope of the invention as defined by the appended claims.
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